

Application No.: 10/688,810  
Amendment dated July 5, 2005  
Reply to Office Action of April 5, 2005

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**CLAIMS**

1. (Canceled)
2. (Cancelled)
3. (Cancelled)
4. (Cancelled)
5. (Cancelled)
6. (Original) A FIB system, comprising:

a vacuum system;

a charged particle beam column positioned in the vacuum system for creating a charged particle beam for impinging upon a target, the charged particle beam column including one or more lenses and an aperture having at least one straight edge and being disposed within the column and dimensioned to produce a shaped charged particle beam at the target, said shaped beam having at least one sharp edge corresponding to the at least one aperture straight edge;

a secondary electron or charged particle detection and imaging system; and

a controller for controlling the shaped charged particle beam to irradiate an area on the target to mill material away from or add material to the target.

Application No.: 10/688,810  
Amendment dated July 5, 2005  
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7. (Currently amended) The system of claim 6 in which the aperture is aligned with the one or more lenses to under or over focus the charged particle beam source with respect to the target plane.

8. (Original) The system of claim 7, in which the aperture is rectangular shaped and comprises a major side corresponding to the at least one straight edge disposed near the center of the beam.

9. (Original) The system of claim 8 in which the rectangular aperture has a minor side dimension that is sufficiently small to produce a beam image at the target with a suitably small tail for a slice and view milling application.

10. (Original) The system of claim 6, wherein the charged particle column comprises a line source in a microbeam plasma source for increasing beam current.

11. (Original) The method of claim 6, in which the aperture is positioned and dimensioned in the charged particle beam column to have a maximum beam current density at the at least one sharp edge with said current density rolling off toward an opposite side of the aperture away from the sharp edge in accordance with a particular milling application.

12. (Original) The system of claim 11, wherein the beam is chromatic limited and wherein the target is defocused relative to a first order focal plane in accordance with:  $|Z_0| \geq C_c dE/E_0$  where  $C_c$  is the chromatic aberration coefficient and  $dE/E_0$  is the charged particle energy spread divided by the average charged particle energy.

13. (Original) The system of claim 6, wherein the charged particle column further comprises a stigmator to adjust the beam shape in order to rotate the at least one sharp edge in alignment with an axis on the target.

Application No.: 10/688,810  
Amendment dated July 5, 2005  
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14. (Original) The system of claim 6, wherein said aperture is D-shaped, and the target is de-focused away from a first order focal plane a distance  $Z_0 \geq C_s A_0^2$  where  $C_s$  is the spherical aberration coefficient and  $A_0$  is the maximum beam angle with respect to the optical axis for beams passing through the aperture.

15. (Cancelled)

16. (Cancelled)

17. (Cancelled)

18. (Cancelled)

19. (Cancelled)